Fermentation characteristics of various animal tissues by cheetah faecal inoculum

S. Depauw[1], G. Bosch[2], A. Becker[1,3], M. Hesta[1], K. Whitehouse-Tedd[4], W.H. Hendriks[2], G.P.J. Janssens[1]

[1]Laboratory of Animal Nutrition, Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium; [2]Animal Nutrition Group, Department of Animal Sciences, Wageningen University, Wageningen, the Netherlands; [3]Laboratory of Microbiology, Faculty of Sciences, Ghent University, Ghent, Belgium; [4]Cheetah Outreach, P.O. Box 116, Lynedoch 7603, Western Cape, South Africa.

Corresponding author: Sa.Depauw@UGent.be

Introduction: Recent studies in the cheetah (*Acinonyx jubatus*) show a role for undigested animal tissues (e.g. bone, cartilage, hair, skin, feathers) in hindgut fermentation of this strict carnivore (Depauw et al, 2010 a, b). This study aimed to compare the *in vitro* fermentation kinetics and end-product profiles of different animal-derived substrates, using cheetah faeces as an inoculum. Materials and methods: Fresh faecal samples of eight captive cheetahs were collected within 15 min of defecation, pooled and processed to be used as inoculum. The following raw and homogenised (1mm sieve) substrates were used: rabbit bone, rabbit hair, rabbit skin, whole rabbit, chicken cartilage, beef, beef + bone, beef + cartilage, beef + hair, and beef + skin. Cumulative gas production was continuously recorded over a 72 h period and samples of fermentation liquids were taken at 2, 7, 24 and 72 hours of incubation to determine the end product profile (short-chain fatty acids (SCFA), branched-chain fatty acids (BCFA), ammonia, indole, phenol, p-cresol). Results and discussion: All animal substrates showed an early occurrence of maximum gas production rates (Tmax = 0.1-0.7 h), which confirms our previous findings. Cartilage was highly fermentable and showed the highest gas production as well as SCFA production. Beef exhibited a lower gas production rate than cartilage, and was slower to achieve high SCFA concentrations, which were only detected after 7 hours of incubation, compared to 2 hours for cartilage. Compared to cartilage and beef, whole rabbit, rabbit bone, and skin were low fermentable, and hair exhibited the lowest gas and SCFA production. Fermentation of bone yielded ammonia concentrations that were twice as high as all other substrates. The combination of a fermentable substrate (beef) with low fermentable animal tissue showed no clear interactions. Conclusion: The present data indicate that cartilage and beef are well fermentable substrates for the cheetah, with cartilage being the most fermentable of both. Low fermentable substrates (hair, skin, bone) in homogenised forms did not appear to reduce the fermentation of beef in this *in vitro* set up. References: available on request.